

# **Traffic Analysis for South Peninsula Hebrew Day School**

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**Prepared at the request of the City of Sunnyvale for  
the South Peninsula Hebrew Day School**

**Prepared by**

**Korve Engineering  
1570 The Alameda, Suite 222  
San Jose, CA 95126  
408-298-2929**

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## INTRODUCTION

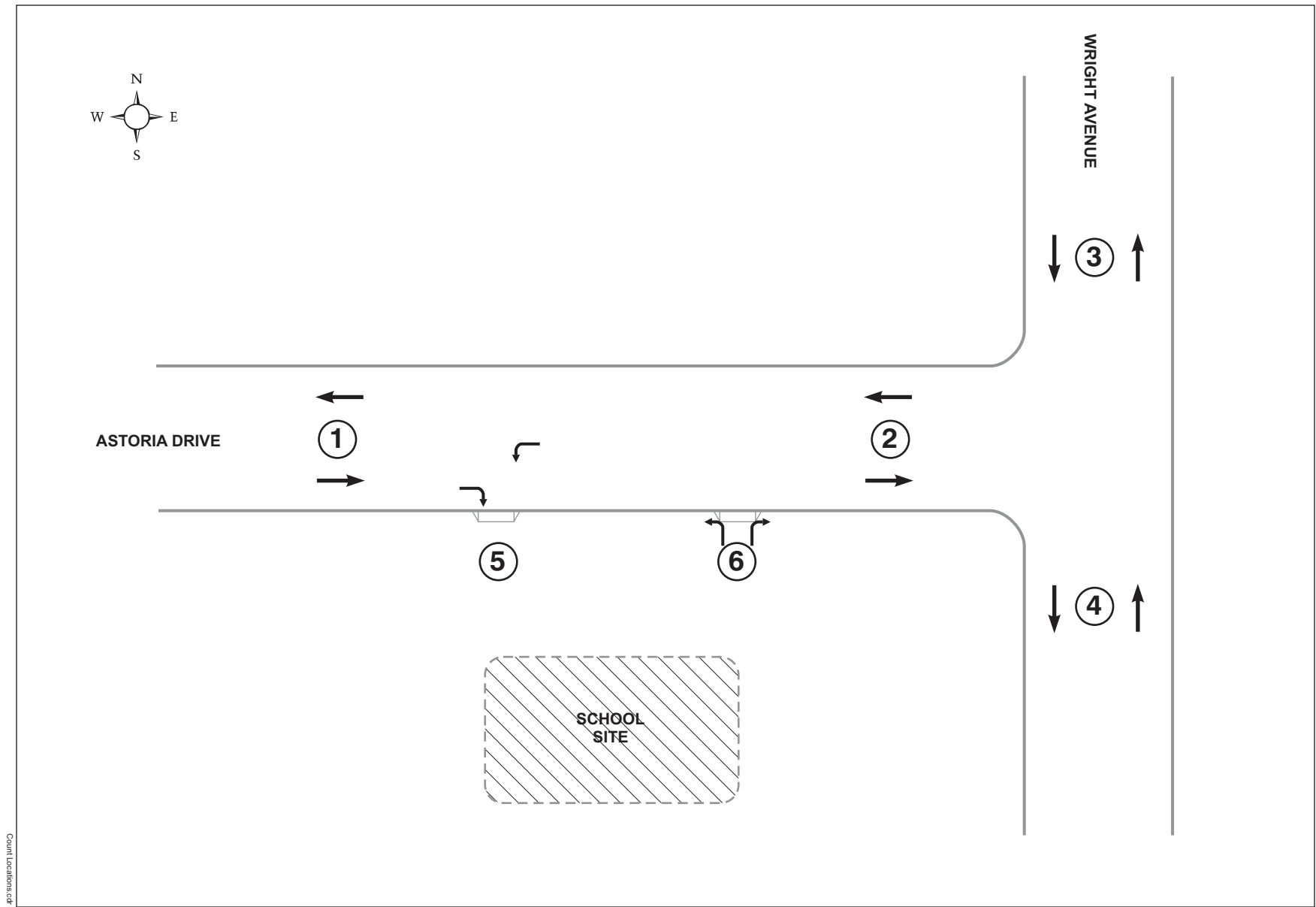
The South Peninsula Hebrew Day School (SPHDS) project is located at 1030 Astoria Drive, Sunnyvale, California. The project, as proposed, will consist of adding a 5,717 square foot synagogue and 12,662 square foot administrative area and library to support the existing school site. The synagogue functions currently use the school facilities. The new synagogue will increase the seated capacity from approximately 140 seats today within the existing school multi-purpose room to 220 seats in the proposed facility. The administrative area and library will support the existing school. At most, one additional employee not currently working at the school will be added to this area. The library will not be open to the public, but will only support the school. In addition, the City of Sunnyvale requested an analysis of increasing the student body by 100 students. Currently, 260 students attend the school. The maximum capacity is 360 students. The City also requested that an alternative be included that assumes the expanded synagogue functions as a typical church. This scenario has been included as information to the City.

## DATA COLLECTION

To assist in the development of trip generation and trip distribution for the project, extensive traffic data were collected. Traffic hose counts were collected at six locations, as noted in Figure 1. These traffic counts were collected for Thursday, Friday, Saturday, and Sunday, November 18, 2004 through November 21, 2004. The traffic count locations shown on Figure 1 are:

1. Astoria Drive, west of the site (bi-directional)
2. Astoria Drive, east of the site (bi-directional)
3. Wright Avenue, north of Astoria Drive (bi-directional)
4. Wright Avenue, south of Astoria Drive (bi-directional)
5. Driveway serving vehicles entering the site (inbound only), and
6. Driveway serving vehicles exiting the site (outbound only).

Table 1 summarizes the daily traffic volumes observed on the public roadways surrounding the project site. Daily traffic volumes summarized in Table 1 are categorized by weekday volumes, Saturday volumes, and Sunday volumes. Astoria Drive carries about 900 vehicles per day on a weekday and closer to 500 vehicles per day on a Saturday and a Sunday. Wright Avenue, north of Astoria Drive, carries almost 3,800 vehicles per day on a weekday and nearly 2,800 vpd on a Saturday and 2,250 vpd on a Sunday. Traffic volumes on Wright Avenue south of Astoria Drive are less than north of Astoria Drive. On a weekday the traffic on Wright Avenue south of Astoria Drive are about 3,000 vpd. On a Saturday the daily traffic volume is approximately 2,300 vpd and on a Sunday, the daily traffic volume is about 1,750 vpd. The City of Sunnyvale's Neighborhood Traffic Calming program states, "If the street carries more than 1,000 vehicles per day, then the street would be eligible for Traffic Calming". While Astoria Drive approaches the City's threshold, it is currently below the 1,000-vehicle volume. Wright Avenue is clearly above the threshold based on today's volumes.



Count Locations.cdr

**Table 1      Average Daily Traffic Volumes (2004)**

<b>Location</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
Astoria Drive, east of Bernardo Avenue	879	453	567
Astoria Drive, west of Wright Avenue	936	465	555
Wright Avenue, north of Astoria Drive	3,778	2,764	2,240
Wright Avenue, south of Astoria Drive	3,024	2,285	1,746

### ***Weekday Traffic Volumes***

Traffic patterns were established from the traffic count data. Figure 2 shows traffic volume graphs for Wright Avenue. The graphs show that weekday AM and PM peak periods occur around 8 AM and 5 PM. The AM peak is more pronounced than the PM peak. Also, the northbound traffic is dominant in the AM and southbound traffic is dominant in the PM peak hour.

The next series of figures shows the traffic volumes throughout the day on Astoria Drive in the vicinity of the school. Because the traffic volumes on Astoria Drive are greatly associated with the school, the traffic volumes are grouped into inbound and outbound volumes. Figure 3 shows the inbound volumes on Thursday. The inbound volumes are made up of the eastbound traffic on Astoria west of the school driveways, and westbound traffic on Astoria east of the school driveways. This graphic shows that the inbound traffic is fairly balanced between the eastbound and westbound direction. Also, the inbound traffic is much higher in the AM than in the PM, as expected. Figure 3 also shows the inbound traffic to the school. The inbound traffic to the school tracks exactly at the three peaks seen throughout the day for traffic on Astoria Drive.

Figure 4 shows the outbound traffic volumes on Thursday. The outbound volumes are made up of the westbound traffic on Astoria west of the school driveways, and eastbound traffic on Astoria east of the school driveways. This graphic shows a slightly higher eastbound outbound movement than westbound. It also shows more balance in the outbound flows between the peaks. Again, the outbound traffic from the school as measured at the outbound driveway tracks exactly with the three peaks.

Figures 5 and 6 show Friday inbound and outbound volumes, respectively. Figure 5 shows that eastbound and westbound inbound volumes are fairly balanced, with the AM traffic being significantly higher than the traffic in the PM. The school inbound traffic, as measured at the inbound driveway, tracks exactly with the peaks. The AM peak hour coincides with that on Thursday and occurs at 8 AM. The PM peak, however, occurs at 2 PM on Friday, compared to 3 PM on Thursday.

Figure 6 shows the outbound volumes on Friday. The eastbound outbound traffic volume is higher than the westbound outbound volume. Again, the school traffic tracks with the peaks. The AM peak hour coincides with the AM peak of Thursday, while the PM peak occurs one hour earlier.

Figure 2. Wright Avenue Volumes

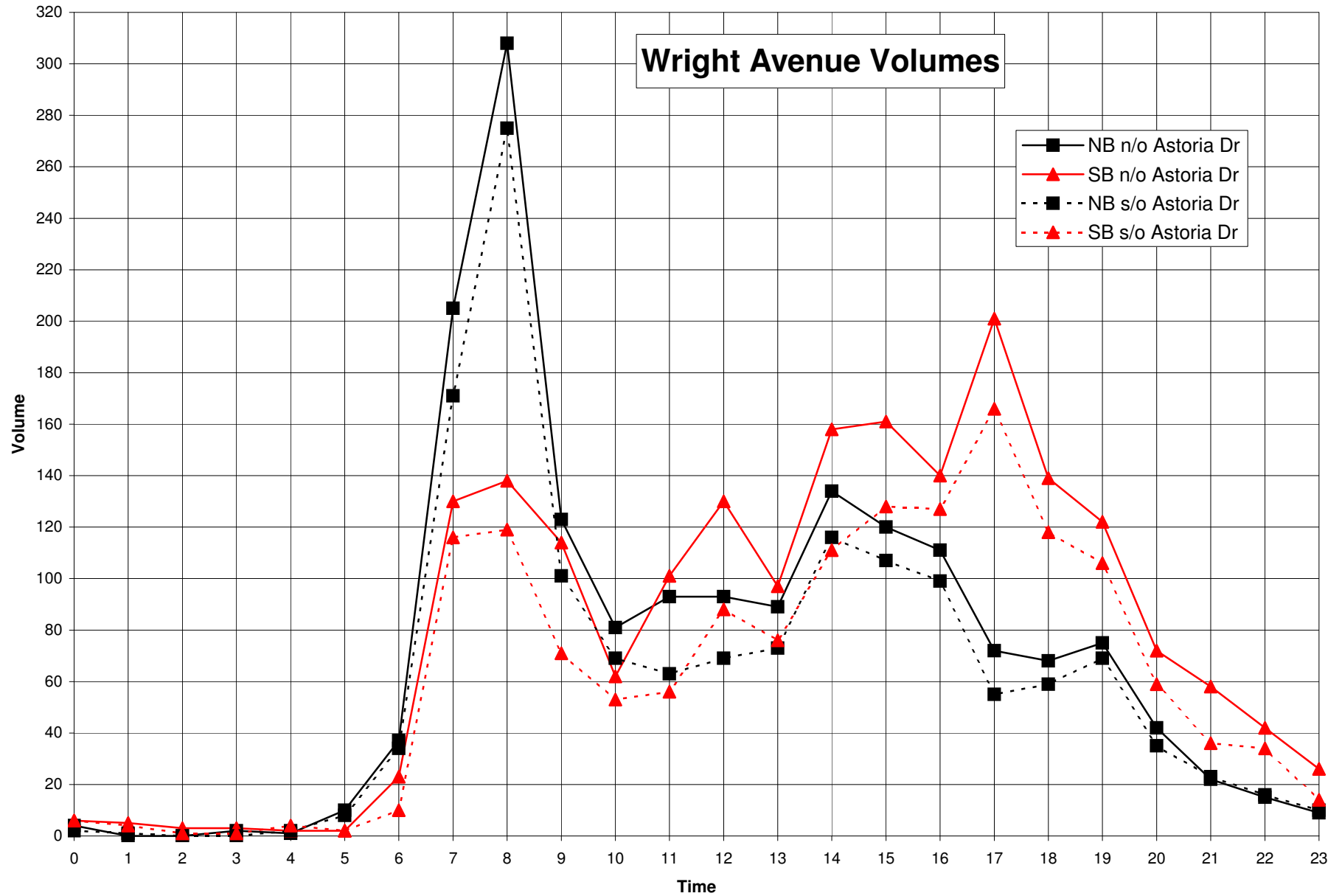


Figure 3. Thursday: Astoria Drive and School Inbound Volumes

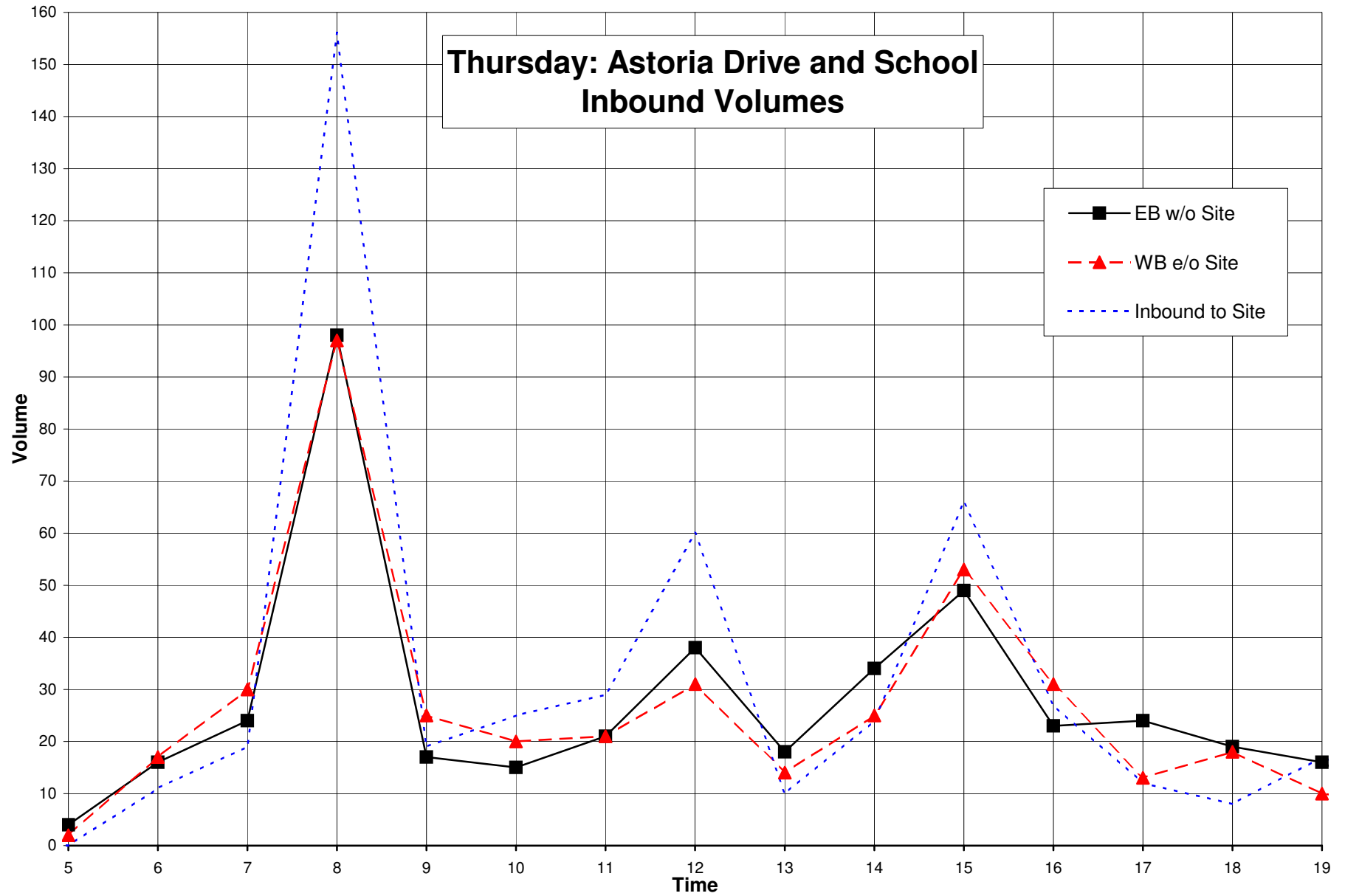




Figure 4. Thursday: Astoria Drive and School Outbound Volumes

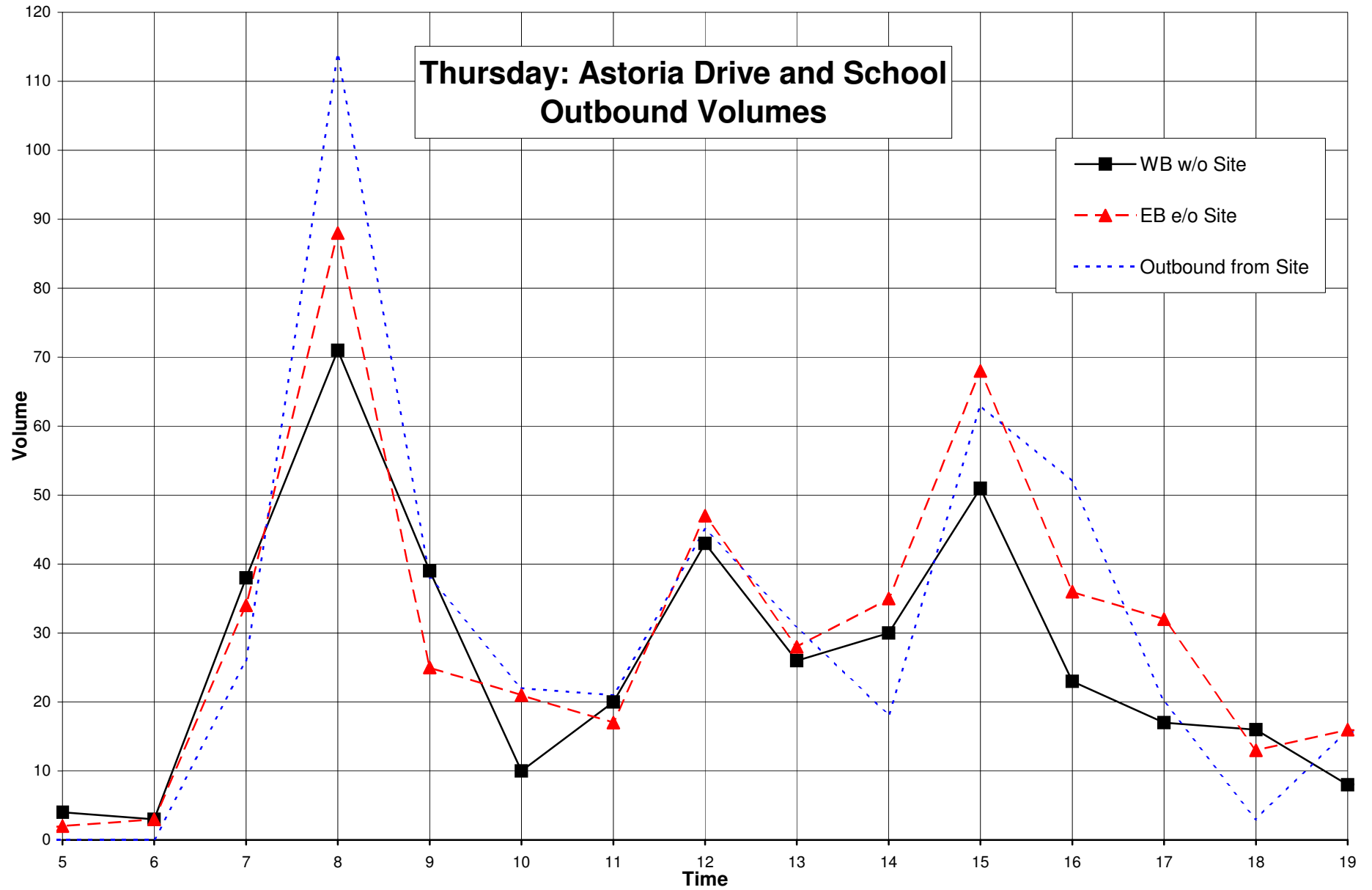


Figure 5. Friday: Astoria Drive and School Inbound Volumes

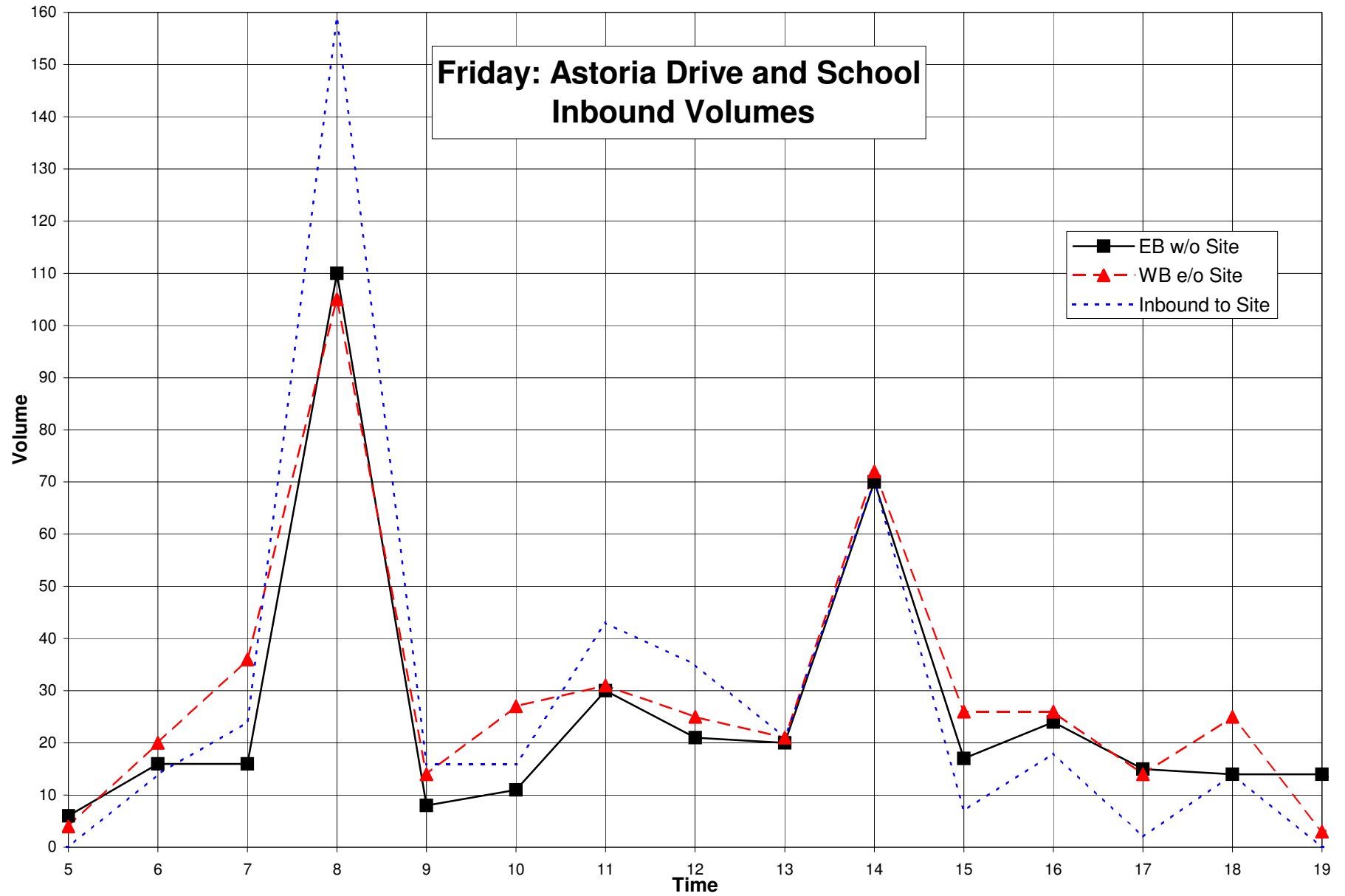
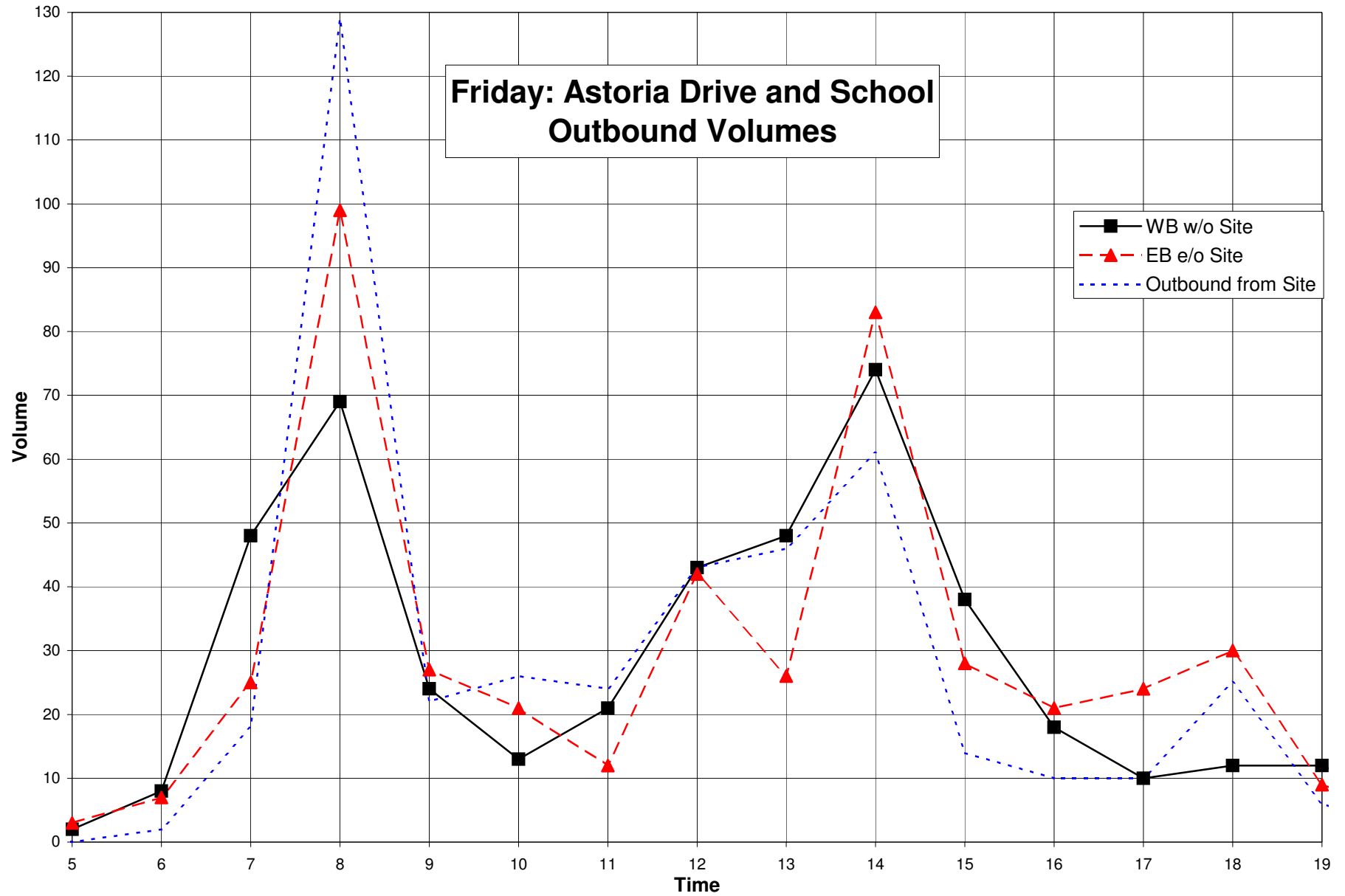


Figure 6. Friday: Astoria Drive and School Outbound Volumes



### ***Weekend Traffic Volumes***

Figures 7 and 8 show Saturday inbound and outbound traffic volumes, respectively. Figure 7 shows that the inbound volumes are fairly balanced during the AM peak at 10 AM. During the PM peak, which occurs at 6 PM, the westbound inbound volume is considerably higher than the inbound eastbound volume. The traffic measured at the school inbound driveway tracks with the peaks, constituting practically all Astoria Drive traffic during the PM peak at 6 PM. The inbound traffic peak noted on Figure 7 at 6 PM is American Zionist Association (AZA) traffic. Young men meet in the parking lot prior to traveling to another destination. AZA meets at the school site for convenience and its assembly is not supported by or involved with either the school or synagogue operations.

Figure 8 shows Astoria Drive and school outbound traffic on Saturday. The outbound westbound volume is higher during the AM peak at 11 AM than the outbound eastbound volume. However, during the PM peak at 6 PM, the outbound eastbound volume is significantly higher than the westbound volume. The outbound peak is again the AZA traffic which appears to travel disproportionately eastbound upon leaving the parking lot. Outbound volumes exiting the school site track the AM and PM peaks exactly.

Figures 9 and 10 show Sunday inbound and outbound volumes, respectively. Sunday traffic is largely associated with the athletic fields and not the SPHDS. Figure 9 shows two AM peaks at 9 AM and 11 AM and two PM peaks at 2 PM and 4 PM. During the 9 AM peak, the eastbound inbound volume is higher than the westbound inbound volume. During the 11 AM peak, the westbound volume is higher than the eastbound inbound volume. The traffic on the inbound driveway tracks the AM peaks exactly. Westbound inbound volume peaks at 2 PM and eastbound inbound volume peaks at 4 PM. The inbound site traffic does not track the PM peaks, indicating that the school does not influence traffic on Astoria Drive during this time period.

Figure 10 shows Sunday outbound volumes. Two AM peaks (9 AM and 11 AM) and one PM peak (2 PM) are observed. For both AM peaks the eastbound outbound traffic is larger than the westbound traffic. The reverse is true for the PM peak. The outbound site driveway volume tracks well with the peaks.

### **TRIP GENERATION**

Several trip generation estimates have been calculated. The first estimate is for a typical weekday that covers the existing school and potential expansion. The second estimate is for a typical Friday evening for synagogue services. The timing of Friday services corresponds to sundown. During the time of project data collection, Friday services began at approximately 4:30 pm. The next trip generation is for Saturday morning synagogue services. Saturday services begin at 9:00 am and end before noon. The City of Sunnyvale asked that a scenario be addressed in this traffic study that assumed the new synagogue is instead used as a typical church. While this is a highly unlikely scenario, the City asked that it be addressed as a worst case scenario. Trip generation of a church is presented for a weekday, including AM and PM peak hours, and for a Saturday and Sunday, including the weekend day peaks.

Figure 7. Saturday: Astoria Drive and School Inbound Volumes

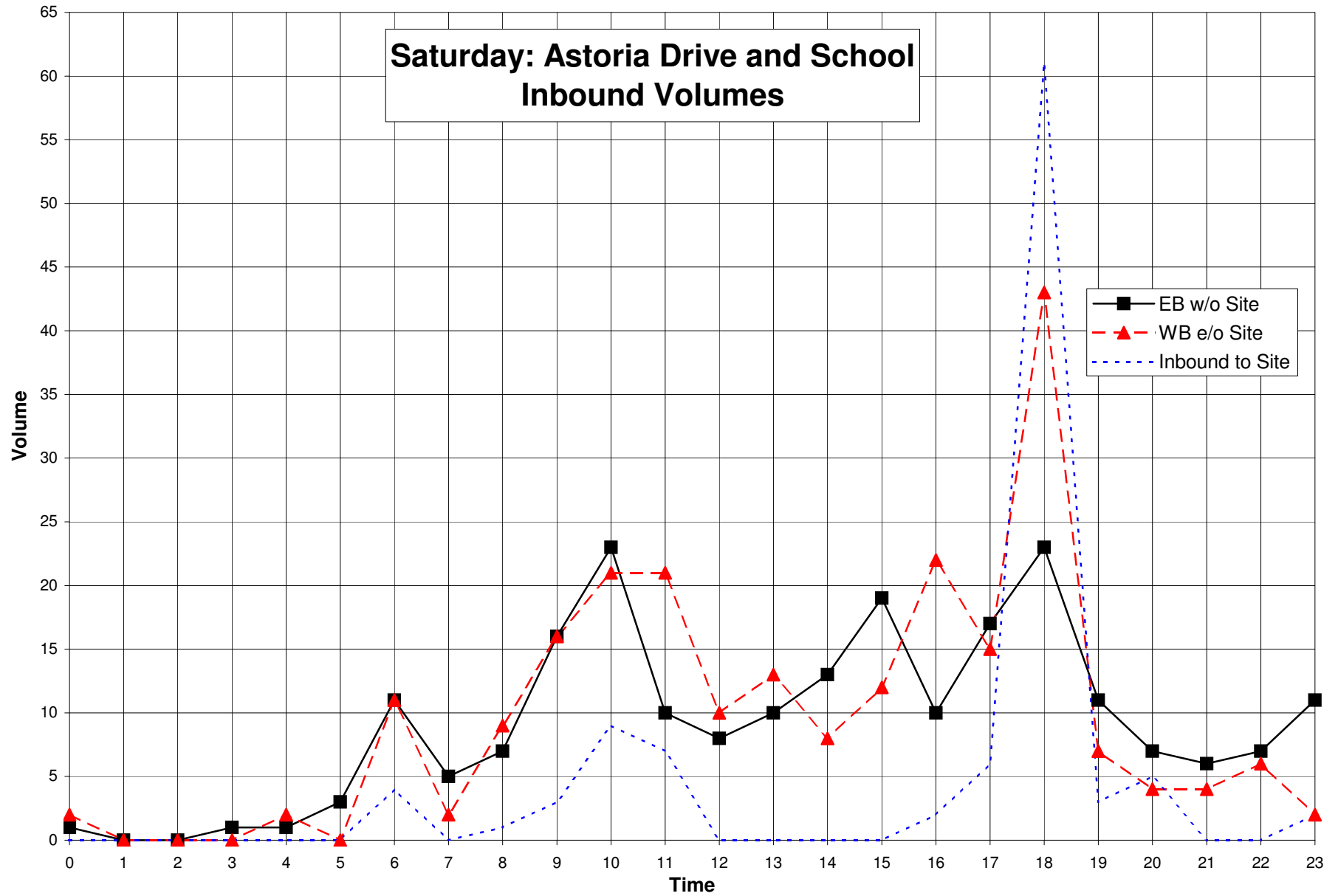


Figure 8. Saturday: Astoria Drive and School Outbound Volumes

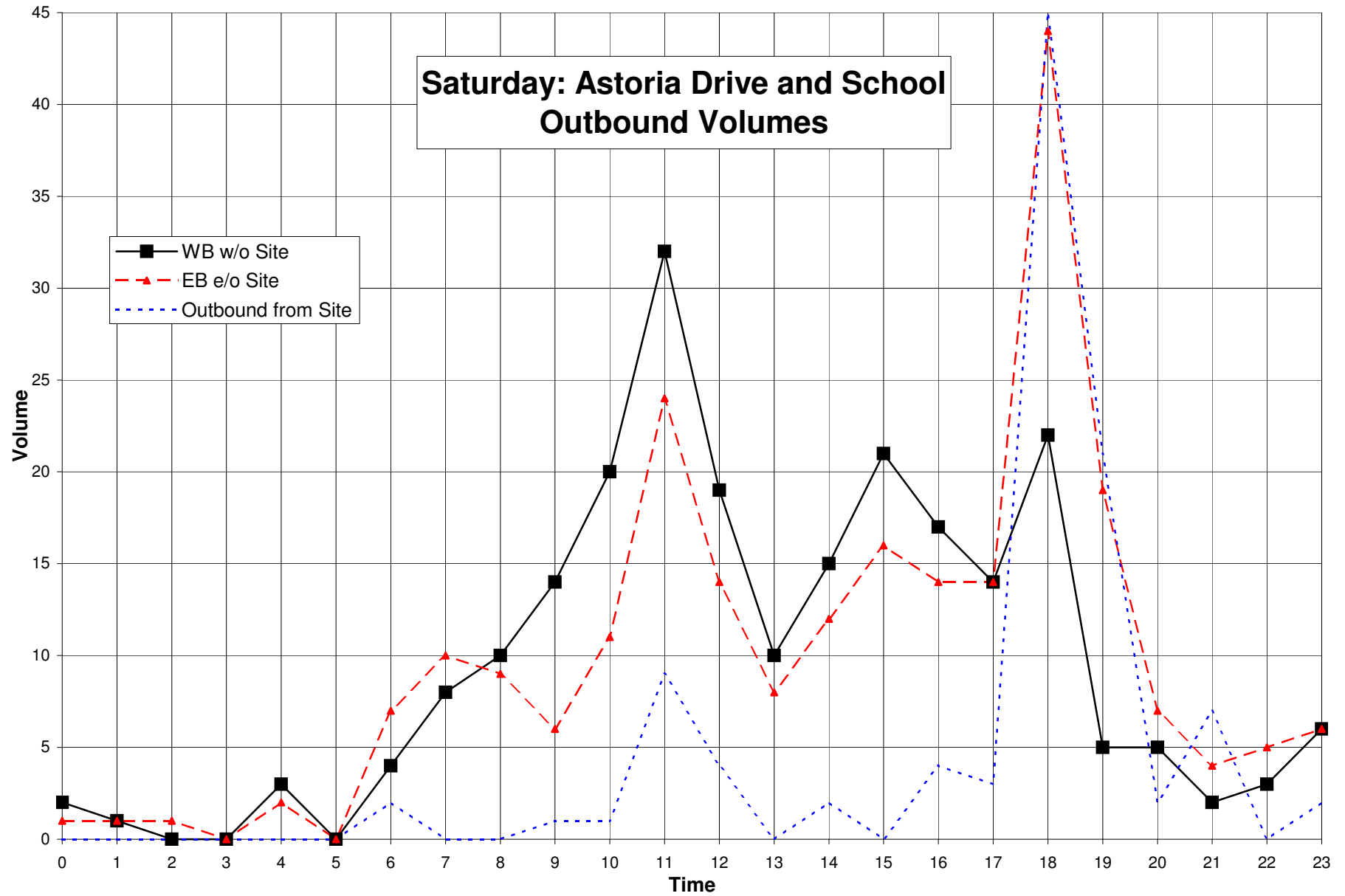


Figure 9. Sunday: Astoria Drive and School Inbound Volumes

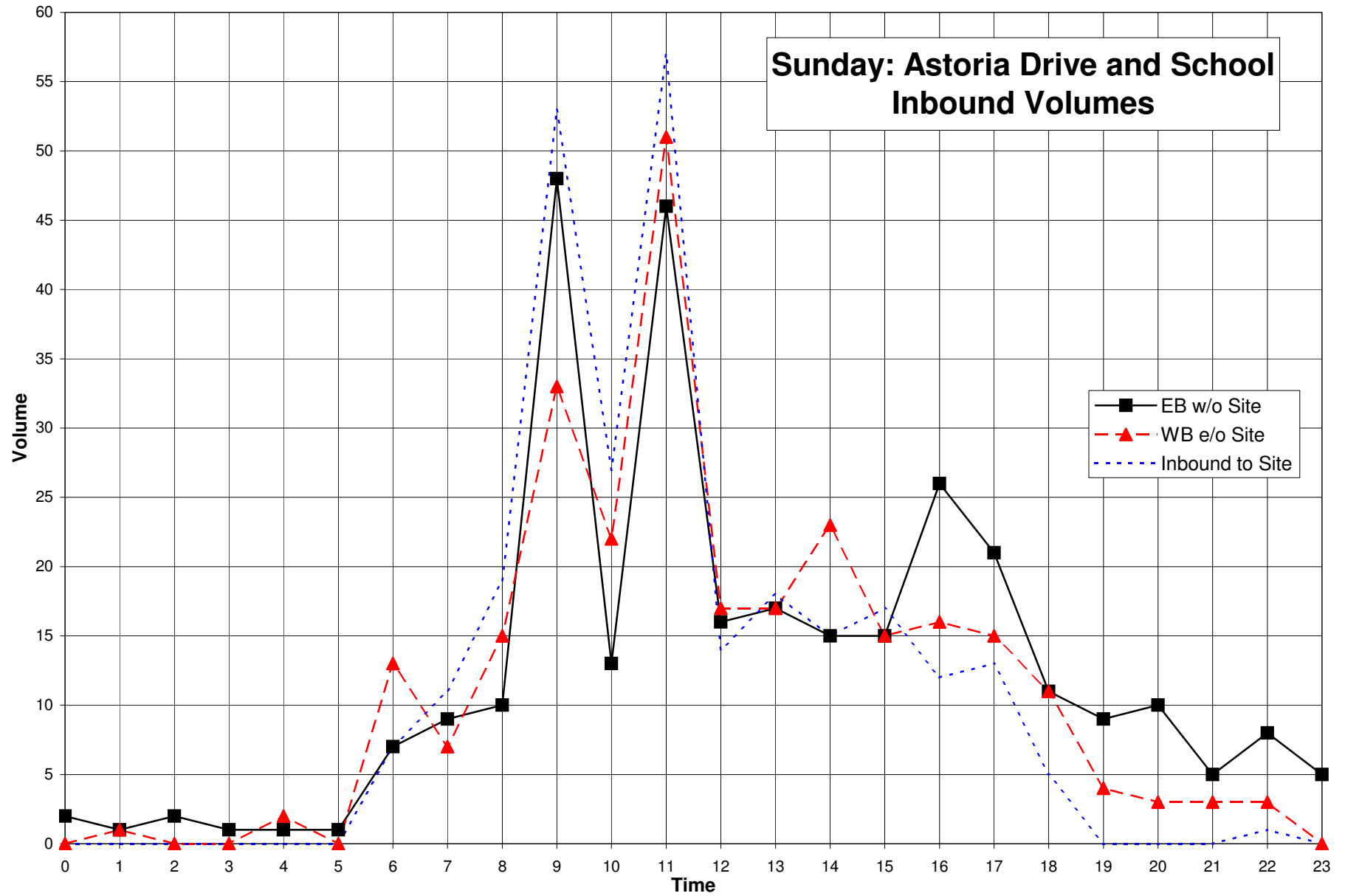
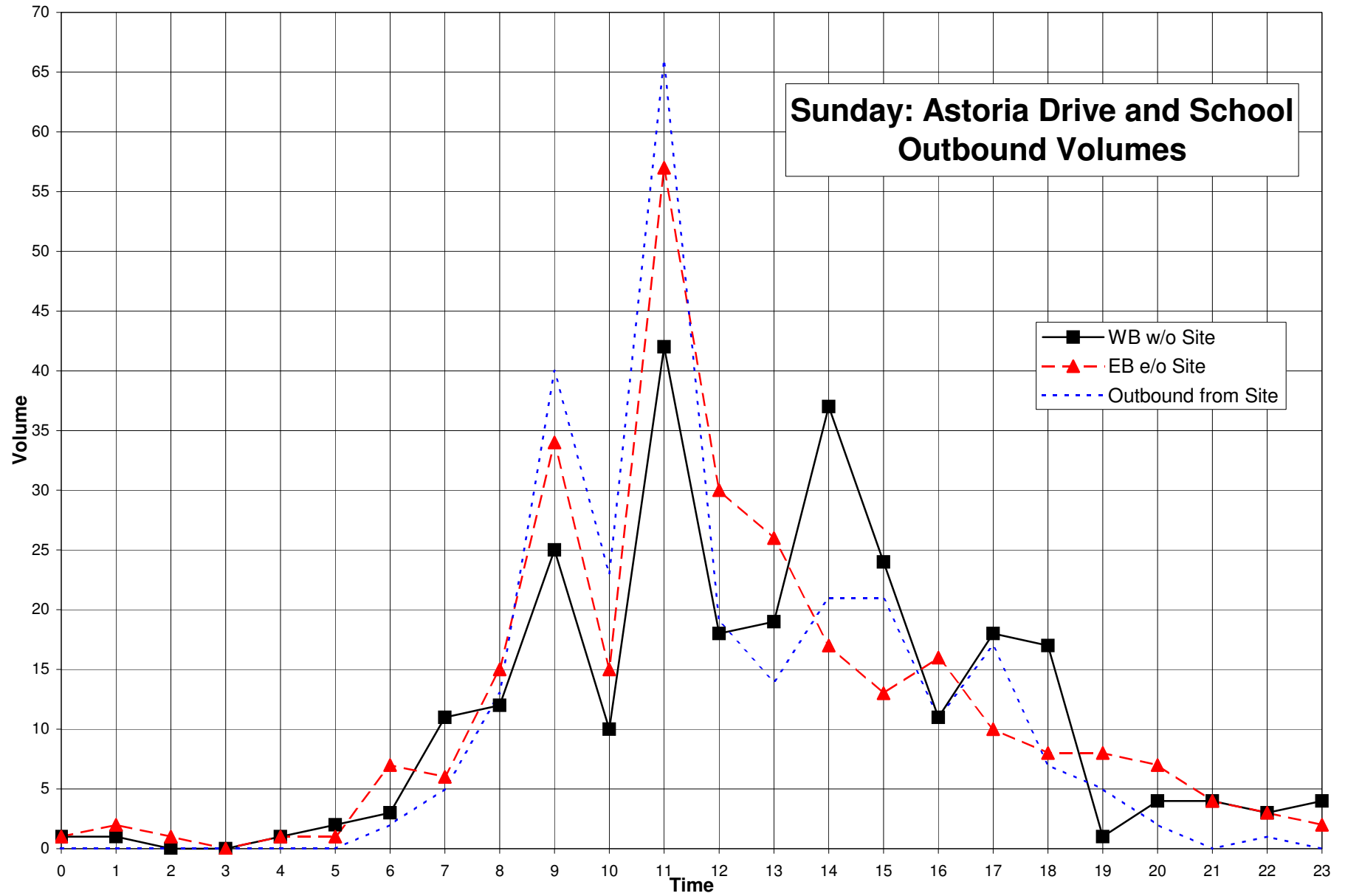


Figure 10. Sunday: Astoria Drive and School Outbound Volumes





Potential trip generation for the SPHDS was estimated using two data sources. First, inbound and outbound traffic volumes to the school were used to determine school traffic. The Institute of Transportation Engineers (ITE) Trip Generation Manual has limited data regarding private schools. Therefore, the existing site data were used to establish trips per student and the directional distribution of traffic during the peak hours.

While the school currently has no plans to expand, their maximum student population is estimated at 360 students or 100 students over the existing population. Any increase in student population would be expected to generate traffic at a rate similar to what is currently observed. A 10 percent reduction in traffic levels currently observed would reflect the fact that no new administrative staff would be needed to increase the student population by 100 students.

The administrative area and library is merely an improvement to existing overcrowding and will accommodate existing employees and serve the existing student population. This area would be sufficient to serve any increase in students. As such, the library would not generate any new traffic, and any increase in traffic will be accounted for in the increased student population.

Existing synagogue services are held in the multi-purpose room of the school. The seated capacity of the multi-purpose room for services is 140. The proposed synagogue will have a seated capacity of 220. The trip generation for the synagogue is based on the traffic counts collected during November 2004, factored to account for the additional capacity to 220 seats. The trip generation for the synagogue is very minor because of the restrictions to driving by the members. In addition to regular services, the synagogue will also be used for special events, such as bar mitzvahs. Special events occur approximately every other month and attract up to 20 inbound and 20 outbound vehicle trips.

Trip generation for a typical church was based on the most recent version of the ITE Trip Generation Manual.

Table 2 shows the school trip generation rates for daily, AM peak, and PM peak traffic, as well as the peak hour directional distribution. The existing school has a daily trip generation rate of 3.8 trips per student. During the AM peak, the rate is 1.04 trips per student and during the PM peak hour 0.20 trips per student. The directional distribution is 58 percent inbound in the AM peak and 57 percent outbound in the PM peak. The rates for the potential school expansion are 10 percent less than existing and the directional distribution remains unchanged.

Table 3 summarizes the trip generation for the school project and shows both potential maximum new trips and potential maximum total trips. Potential maximum new trips would be generated by 100 additional students. Potential maximum total trips are new trips and the trips generated by the existing school combined and represent the total expected traffic volume if the school expanded to 360 students.

Potential school expansion would generate 345 new daily trips, 93 AM trips, and 18 PM trips. Together, the existing uses and the school expansion will generate 1342 daily trips, 363 AM peak trips, and 71 PM peak trips.

**Table 2 School Trip Generation Rates and Entering and Exiting Splits**

Land Use	Indep. Variable	Daily			AM Peak			PM Peak		
		Entering Split	Exiting Split	Average Rate	Entering Split	Exiting Split	Average Rate	Entering Split	Exiting Split	Average Rate
Existing School	260 pupils	50%	50%	3.8	58%	42%	1.04	43%	57%	0.20
Potential School Expansion*	100 pupils	50%	50%	3.5	58%	42%	0.93	43%	57%	0.18

\* Rates reduced by 10 percent to reflect maintaining current staff/administrative levels close to existing, even with more students.

**Table 3 School Trip Generation Results**

		Daily			AM Peak			PM Peak		
		In	Out	Total	In	Out	Total	In	Out	Total
Existing School	260	499	499	997	157	113	270	23	30	53
Potential School Expansion*	100	173	173	345	54	39	93	8	10	18
<b>Potential Maximum New Trips</b>		<b>173</b>	<b>173</b>	<b>345</b>	<b>54</b>	<b>39</b>	<b>93</b>	<b>8</b>	<b>10</b>	<b>18</b>
<b>Potential Maximum Total Trips</b>		<b>671</b>	<b>671</b>	<b>1342</b>	<b>211</b>	<b>153</b>	<b>363</b>	<b>31</b>	<b>41</b>	<b>71</b>

Table 4 shows Friday synagogue trip generation rates and directional distribution for the arriving and departing peaks. The synagogue arriving peak trip generation rate is 0.26 trips per seat. The departing peak rate is 0.28 trips per seat. The directional distribution is 56 percent inbound during the arriving peak and 64 percent outbound for the departing peak. The rates for the synagogue capacity expansion are assumed to be the same as the rates for the existing synagogue capacity and the directional distribution remains unchanged.

The existing synagogue capacity is 140 seats while the proposed capacity is 220. The additional 80 seats will generate 21 new trips during the arriving peak and 22 new trips during the departing peak. At proposed capacity, the synagogue will generate 57 and 61 trips, during the arriving and departing peaks, respectively. Table 5 summarizes the synagogue Friday trip generation.

Table 6 presents Saturday synagogue trip generation rates and directional distribution for the arriving and departing peaks. The arriving peak trip generation rate is 0.03 and entering split is 75 percent. The departing peak trip generation rate is 0.14 with an exiting split of 63 percent. The rates and directional distribution for the synagogue expansion are assumed to be equal to those of the existing synagogue.

**Table 4 Synagogue Friday Trip Generation Rates and Entering and Exiting Splits**

Land Use	Indep. Variable	Arriving Peak			Departing Peak		
		Entering Split	Exiting Split	Average Rate	Entering Split	Exiting Split	Average Rate
Synagogue (Existing)	140	56%	44%	0.26	36%	64%	0.28
Synagogue (Proposed Increase)	80	56%	44%	0.26	36%	64%	0.28

**Table 5 Synagogue Friday Trip Generation Results**

Land Use	Indep. Variable	Arriving Peak			Departing Peak		
		In	Out	Total	In	Out	Total
Synagogue (Existing)	140	20	16	36	14	25	39
Synagogue (Proposed Increase)	80	12	9	21	8	14	22
<b>Potential Maximum New Trips</b>		<b>12</b>	<b>9</b>	<b>21</b>	<b>8</b>	<b>14</b>	<b>22</b>
<b>Potential Maximum Total Trips</b>		<b>32</b>	<b>25</b>	<b>57</b>	<b>22</b>	<b>39</b>	<b>61</b>

**Table 6 Synagogue Saturday Trip Generation Rates and Entering and Exiting Splits**

Land Use	Indep. Variable	Arriving Peak			Departing Peak		
		Entering Split	Exiting Split	Average Rate	Entering Split	Exiting Split	Average Rate
Synagogue (Existing)	140	75%	25%	0.03	37%	63%	0.14
Synagogue (Proposed Increase)	80	75%	25%	0.03	37%	63%	0.14

Table 7 presents the results of Saturday synagogue trip generation. The additional seating capacity will generate a total of 2 trips in the arriving peak and 11 trips during the departing peak. A total of 6 trips will be generated by the expanded synagogue during the arrival peak and a total of 30 trips will be generated during the departing peak on Saturday. The modest amount of traffic reflects the restriction on driving on the Sabbath for synagogue members.

**Table 7 Synagogue Saturday Trip Generation Results**

Land Use	Indep. Variable	Arriving Peak			Departing Peak		
		In	Out	Total	In	Out	Total
Synagogue (Existing)	140	3	1	4	7	12	19
Synagogue (Proposed Increase)	80	2	1	2	4	7	11
<b>Potential Maximum New Trips</b>		<b>2</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>7</b>	<b>11</b>
<b>Potential Maximum Total Trips</b>		<b>5</b>	<b>2</b>	<b>6</b>	<b>11</b>	<b>19</b>	<b>30</b>

Tables 8 through 13 provide the trip generation characteristics and data for a typical church. The City of Sunnyvale requested these data be included for informational purposes. Table 8 summarizes the weekday trip generation characteristics and Table 9 shows the resultant trips.

Table 10 illustrates the trip generation characteristics for a church on Saturday. Table 11 shows the Saturday church volumes. Table 12 contains the trip generation characteristics for a church on a typical Sunday, and Table 13 has the Sunday trip generation volumes. Churches generate most of their traffic on Sundays. Table 13 notes that a 5,717 square foot church would generate 210 trips on a Sunday, 67 during the peak hour.

**Table 8 Typical Church Trip Generation Rates and Entering and Exiting Splits**

Land Use	Indep. Variable	Daily			AM Peak			PM Peak		
		Entering Split	Exiting Split	Average Rate	Entering Split	Exiting Split	Average Rate	Entering Split	Exiting Split	Average Rate
Church	5,717 s.f.	50%	50%	9.11	54%	46%	0.72	52%	48%	0.66

**Table 9 Typical Church Trip Generation Results**

Land Use	Indep. Variable	Daily			AM Peak			PM Peak		
		In	Out	Total	In	Out	Total	In	Out	Total
Church	5,717	26	26	52	2	2	4	2	2	4
Potential Maximum New Trips		26	26	52	2	2	4	2	2	4

**Table 10 Typical Church Saturday Trip Generation Rates and Entering and Exiting Splits**

Land Use	Indep. Variable	Daily			Peak Hour		
		Entering Split	Exiting Split	Average Rate	Entering Split	Exiting Split	Average Rate
Church	5,717 s.f.	50%	50%	10.37	71%	29%	3.54

**Table 11 Typical Church Saturday Trip Generation Results**

Land Use	Indep. Variable	Daily			Peak Hour		
		In	Out	Total	In	Out	Total
Church	5,717 s.f.	30	30	60	14	6	20
Potential Maximum New Trips		30	30	60	14	6	20

**Table 12 Typical Church Sunday Trip Generation Rates and Entering and Exiting Splits**

Land Use	Indep. Variable	Daily			Peak Hour		
		Entering Split	Exiting Split	Average Rate	Entering Split	Exiting Split	Average Rate
Church	5,717 s.f.	50%	50%	36.63	50%	50%	11.76

**Table 13 Typical Church Sunday Trip Generation Results**

Land Use	Indep. Variable	Daily			Peak Hour		
		In	Out	Total	In	Out	Total
Church	5,717 s.f.	105	105	210	34	33	67
Potential Maximum New Trips		105	105	210	34	33	67

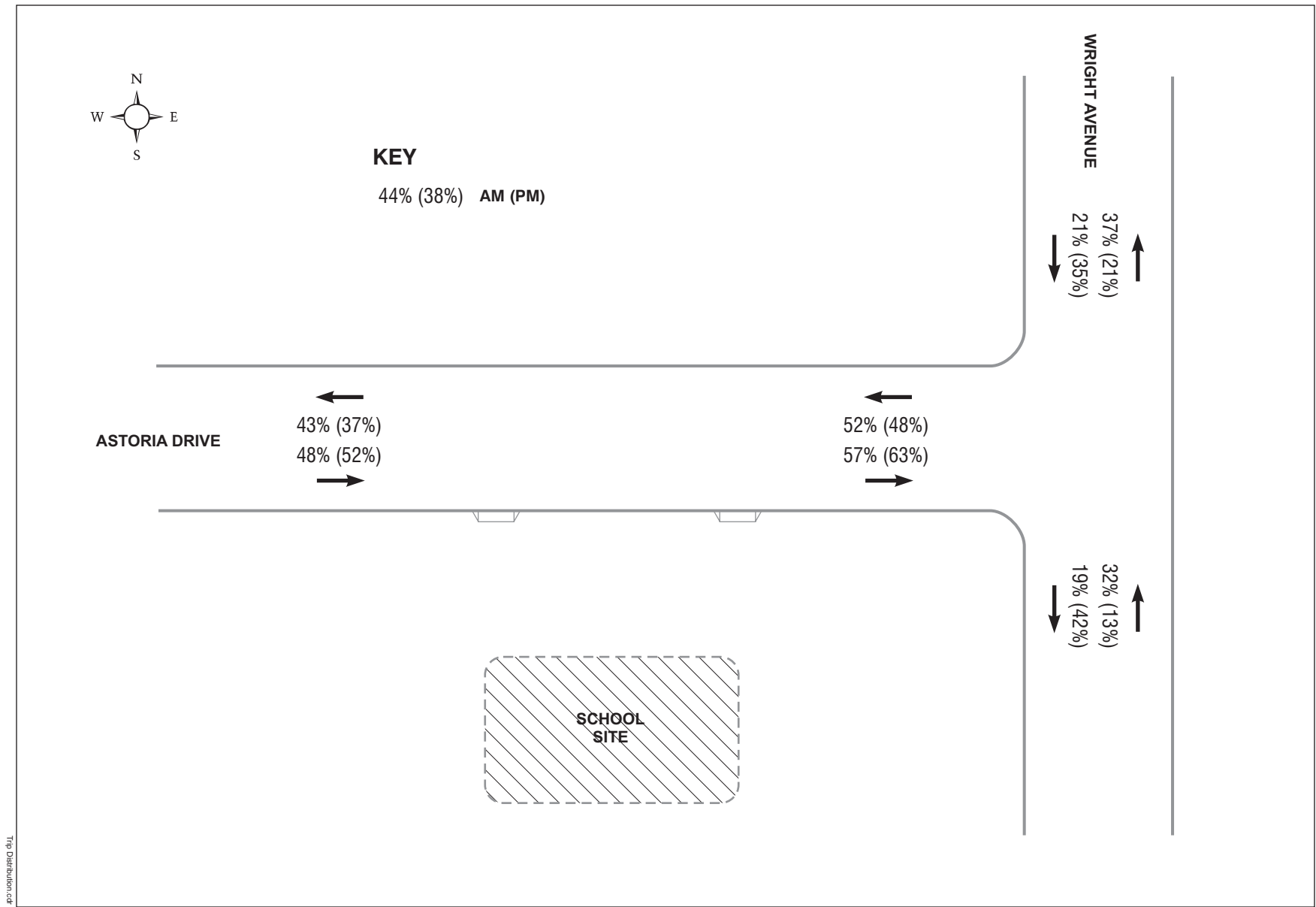
## TRIP DISTRIBUTION

Trip distribution was based on the peak hour directional volumes on Astoria Drive and Wright Avenue. It was assumed that the trips generated by the existing uses are distributed similarly to the directional distribution of the volumes on the adjacent streets, e.g. the proportion of inbound site trips coming from the west on Astoria Drive is equal to the proportion of Astoria Drive traffic from the west, in relation to the total traffic approaching the site from the west and the east. Similarly, the distribution of outbound site trips departing to the west on Astoria Drive would be equal to the proportion of westbound Astoria Drive traffic recorded to the west of the site in relation to the total of westbound traffic recorded to the west of the site and eastbound traffic recorded to the east of the site.

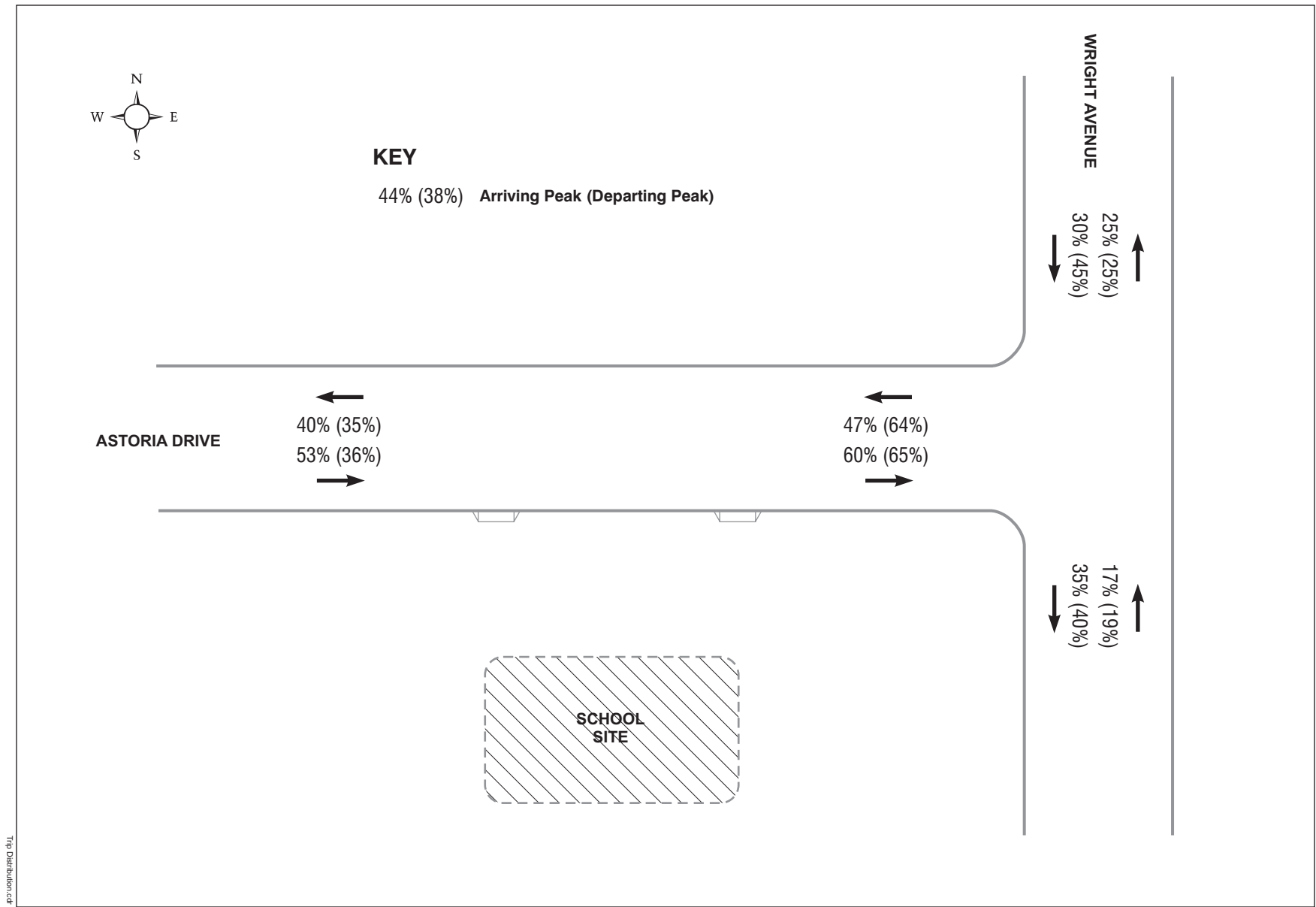
The results of the trip distribution calculations are presented in Tables 14, 15, and 16. Table 14 provides the trip distribution for school traffic on a daily, AM peak, and PM peak hour basis. Table 15 shows the arriving peak and departing peak distribution for synagogue traffic on a Friday. Table 16 shows the distribution patterns on a Saturday for synagogue traffic. This pattern is assumed to reflect the travel patterns of a hypothetical church on a typical Sunday. Figure 11 presents trip distribution results for the school weekday AM and PM peak hours. Figures 12 and 13 show the results of trip distribution for the synagogue peak periods on Friday and Saturday, respectively. Figure 14 shows the trip distribution for a hypothetical church on a typical Sunday

**Table 14 School Trip Distribution Results**

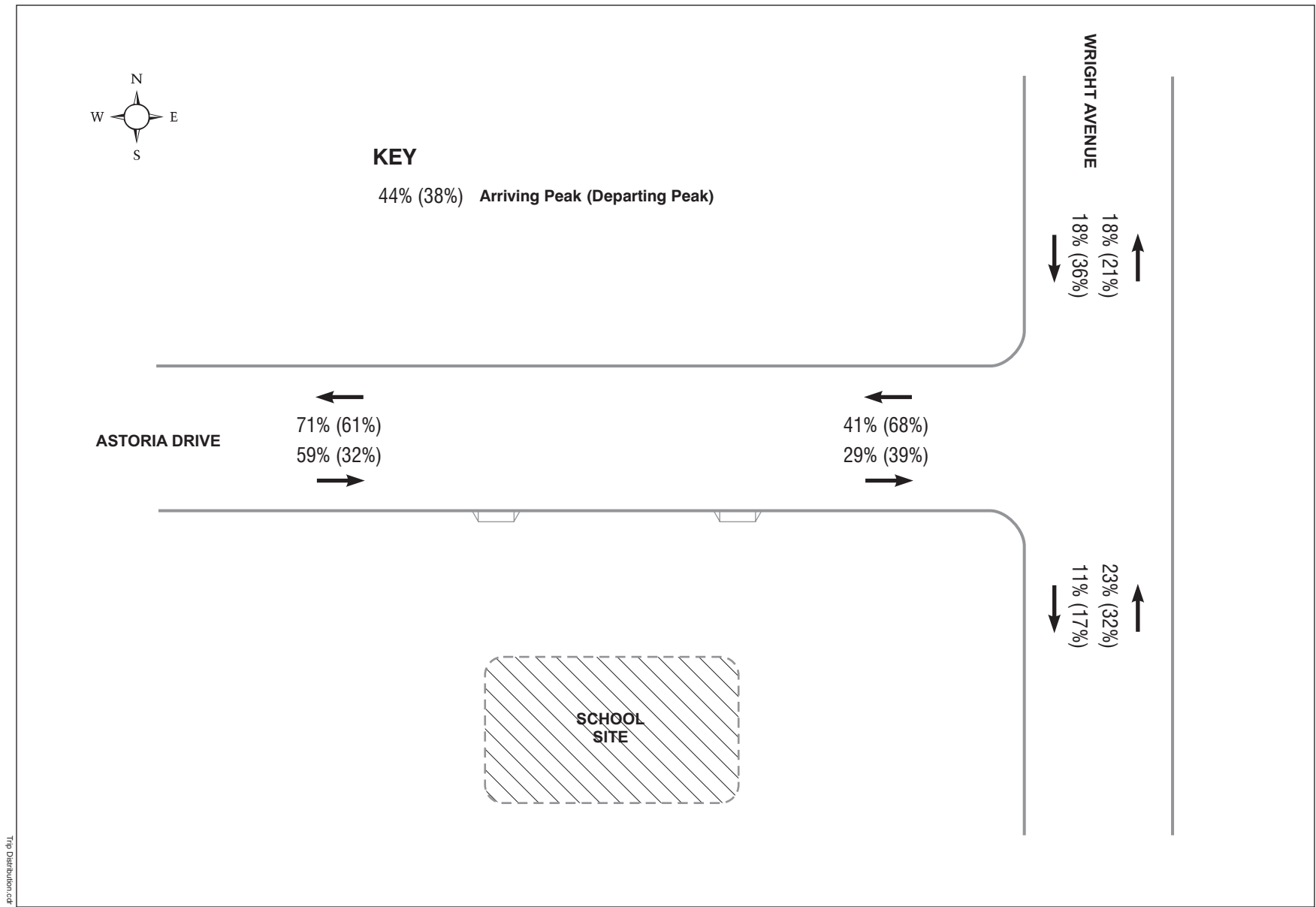
Location/Direction	Daily			AM Peak			PM Peak		
	Volume	Ratio	Link Distrib.	Volume	Ratio	Link Distrib.	Volume	Ratio	Link Distrib.
W Astoria EB IN	442	0.51	51%	98	0.48	48%	24	0.52	52%
E Astoria WB IN	433	0.49	49%	107	0.52	52%	22	0.48	48%
<b>Total</b>	<b>875</b>			<b>205</b>			<b>46</b>		
W Astoria WB OUT	434	0.47	47%	71	0.43	43%	22	0.37	37%
E Astoria EB OUT	493	0.53	53%	93	0.57	57%	38	0.63	63%
<b>Total</b>	<b>927</b>			<b>164</b>			<b>60</b>		
N Wright SB IN	1935	0.57	28%	203	0.39	21%	201	0.73	35%
S Wright NB IN	1457	0.43	21%	311	0.61	32%	75	0.27	13%
<b>Total</b>	<b>3392</b>			<b>514</b>			<b>276</b>		
N Wright NB OUT	1714	0.53	28%	348	0.66	37%	84	0.34	21%
S Wright SB OUT	1506	0.47	25%	182	0.34	19%	166	0.66	42%
<b>Total</b>	<b>3220</b>			<b>530</b>			<b>250</b>		



Trip Distribution.cdf

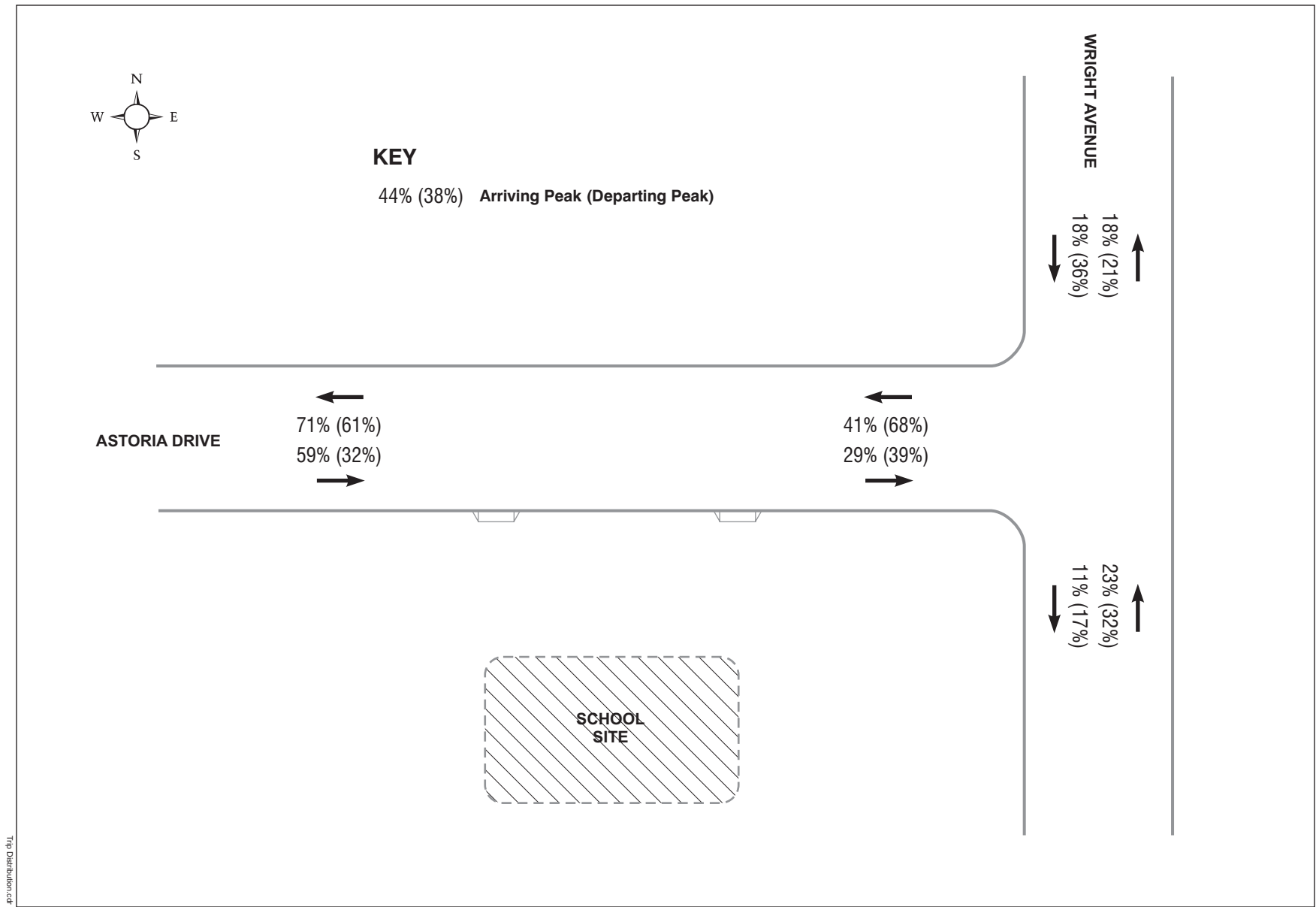


Trip Distribution.cdf



Trips Distribution: cd





Trip Distribution.ctb

## TRIP ASSIGNMENT

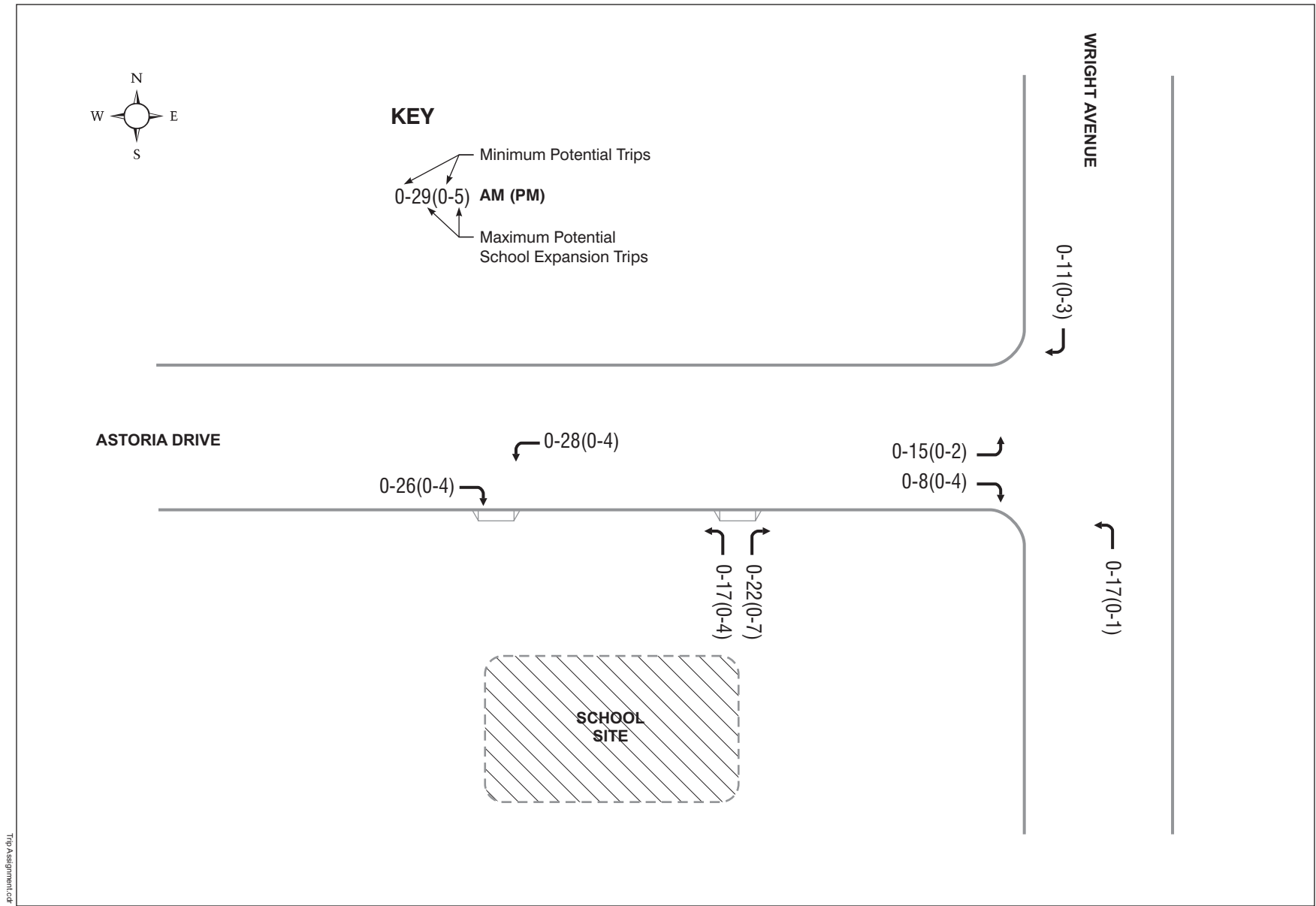
Trip assignment was based on the trip generation and trip distribution results outlined above. Trip assignment results for the school during both peak periods are noted in Figure 15. Figure 16 shows the maximum and minimum Friday trips for the synagogue functions and Figure 17 shows the maximum and minimum trips for the synagogue functions on a Saturday. The results are presented in ranges, as the number of new trips generated by the school and synagogue expansions will vary from zero and maximum new trips generated by the respective expansions.

**Table 15 Synagogue Friday Trip Distribution Results**

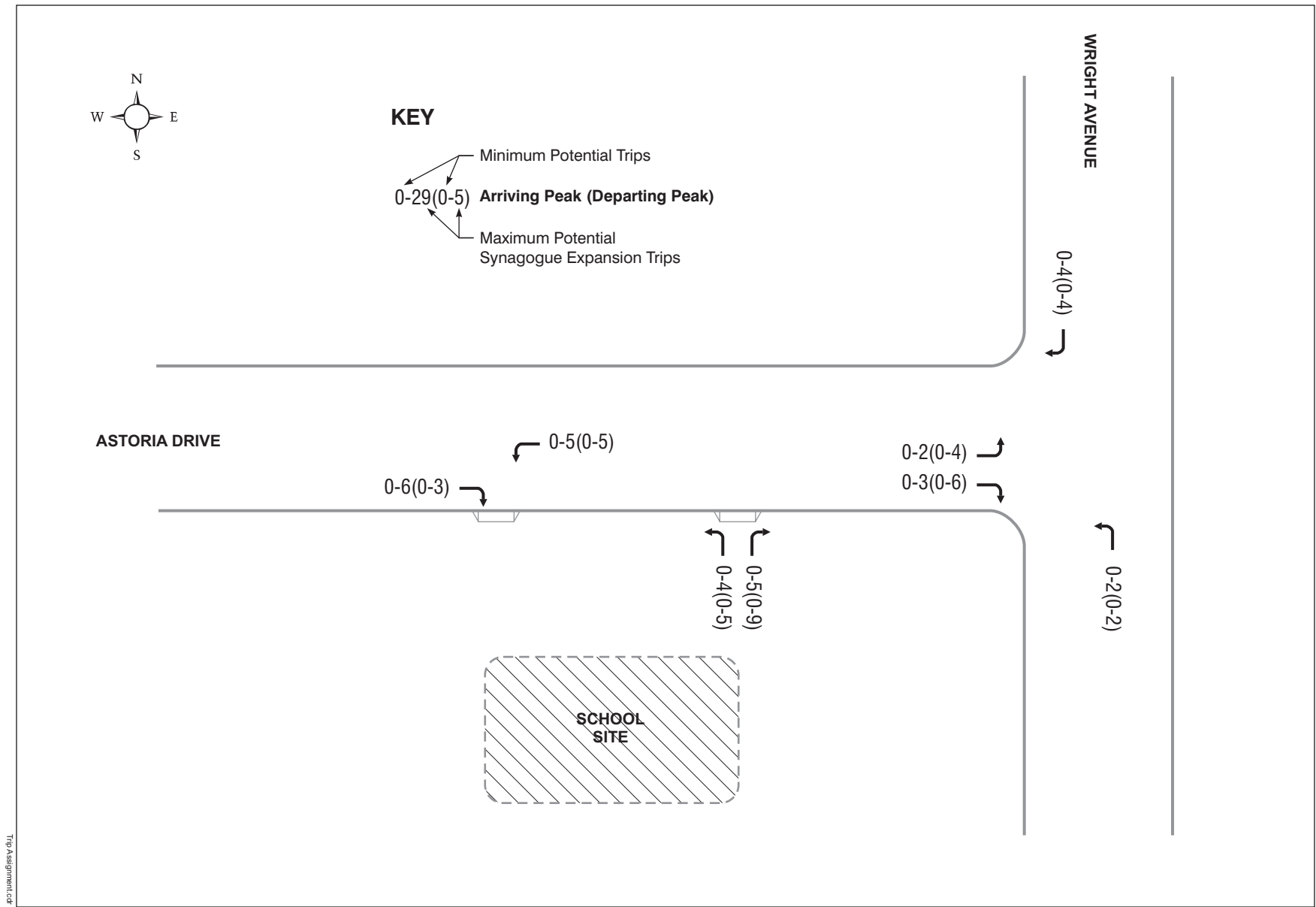
Location/Direction	Arriving Peak			Departing Peak		
	Volume	Ratio	Link Distrib.	Volume	Ratio	Link Distrib.
W Astoria EB IN	29	0.53	53%	14	0.36	36%
E Astoria WB IN	26	0.47	47%	25	0.64	64%
<b>Total</b>	<b>55</b>			<b>39</b>		
W Astoria WB OUT	18	0.40	40%	16	0.35	35%
E Astoria EB OUT	27	0.60	60%	30	0.65	65%
<b>Total</b>	<b>45</b>			<b>46</b>		
N Wright SB IN	173	0.64	30%	174	0.70	45%
S Wright NB IN	96	0.36	17%	76	0.30	19%
<b>Total</b>	<b>269</b>			<b>250</b>		
N Wright NB OUT	100	0.42	25%	95	0.38	25%
S Wright SB OUT	137	0.58	35%	152	0.62	40%
<b>Total</b>	<b>237</b>			<b>247</b>		

**Table 16 Synagogue Saturday or Church Sunday Trip Distribution Results**

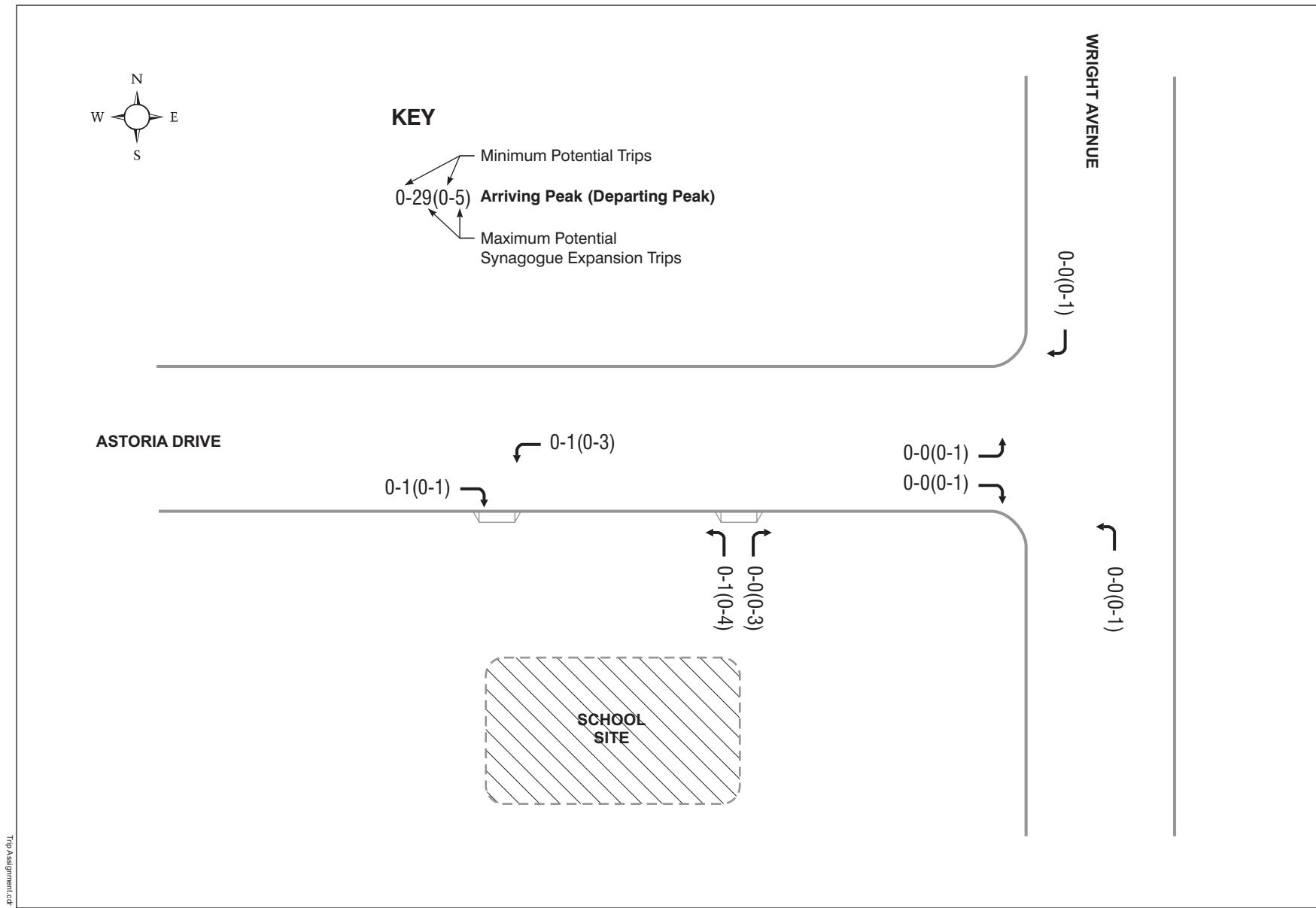
Location/Direction	Arriving Peak			Departing Peak		
	Volume	Ratio	Link Distrib.	Volume	Ratio	Link Distrib.
W Astoria EB IN	23	0.59	59%	10	0.32	32%
E Astoria WB IN	16	0.41	41%	21	0.68	68%
<b>Total</b>	<b>39</b>			<b>31</b>		
W Astoria WB OUT	17	0.71	71%	38	0.61	61%
E Astoria EB OUT	7	0.29	29%	24	0.39	39%
<b>Total</b>	<b>24</b>			<b>62</b>		
N Wright SB IN	64	0.44	18%	128	0.53	36%
S Wright NB IN	81	0.56	23%	113	0.47	32%
<b>Total</b>	<b>145</b>			<b>241</b>		
N Wright NB OUT	99	0.63	18%	142	0.55	21%
S Wright SB OUT	58	0.37	11%	114	0.45	17%
<b>Total</b>	<b>157</b>			<b>256</b>		



Trip Assignment.cdr



Trip Assignment.cdr



Trip Assignment.cdr

Figure 18 shows the trip assignment for typical church on a Sunday. The distribution pattern for a church is assumed to be similar to that observed for the synagogue.

## **PARKING ANALYSIS**

### ***Data Collection***

The analysis of parking is based on the data collected in November 2004, on a Tuesday, a Friday, a Saturday, and a Sunday. Off-street and on-street parking activity data were collected. Off-street parking is comprised of parking on the school parking lots. On-street parking is parking along the curbs adjacent to the school site, beginning at the western property line and ending near the San Antonio Park driveway. Parking on the opposite site of Astoria Drive was not included in the totals.

Off-street parking capacity is assumed to be the total number of spaces customarily used for parking on the school parking lots. The total number of parking spaces includes unmarked spaces that were consistently used for legal parking. Currently there are 58 off-street parking spaces, including three handicap spaces and five unmarked spaces.

On-street parking capacity was calculated by dividing the length of the available curb by the assumed automobile occupancy length of 23 feet. The existing on-street parking supply is 24 spaces. Figure 19 notes the current on-street and off-street parking totaling 82 spaces.

### **Existing Parking Demand**

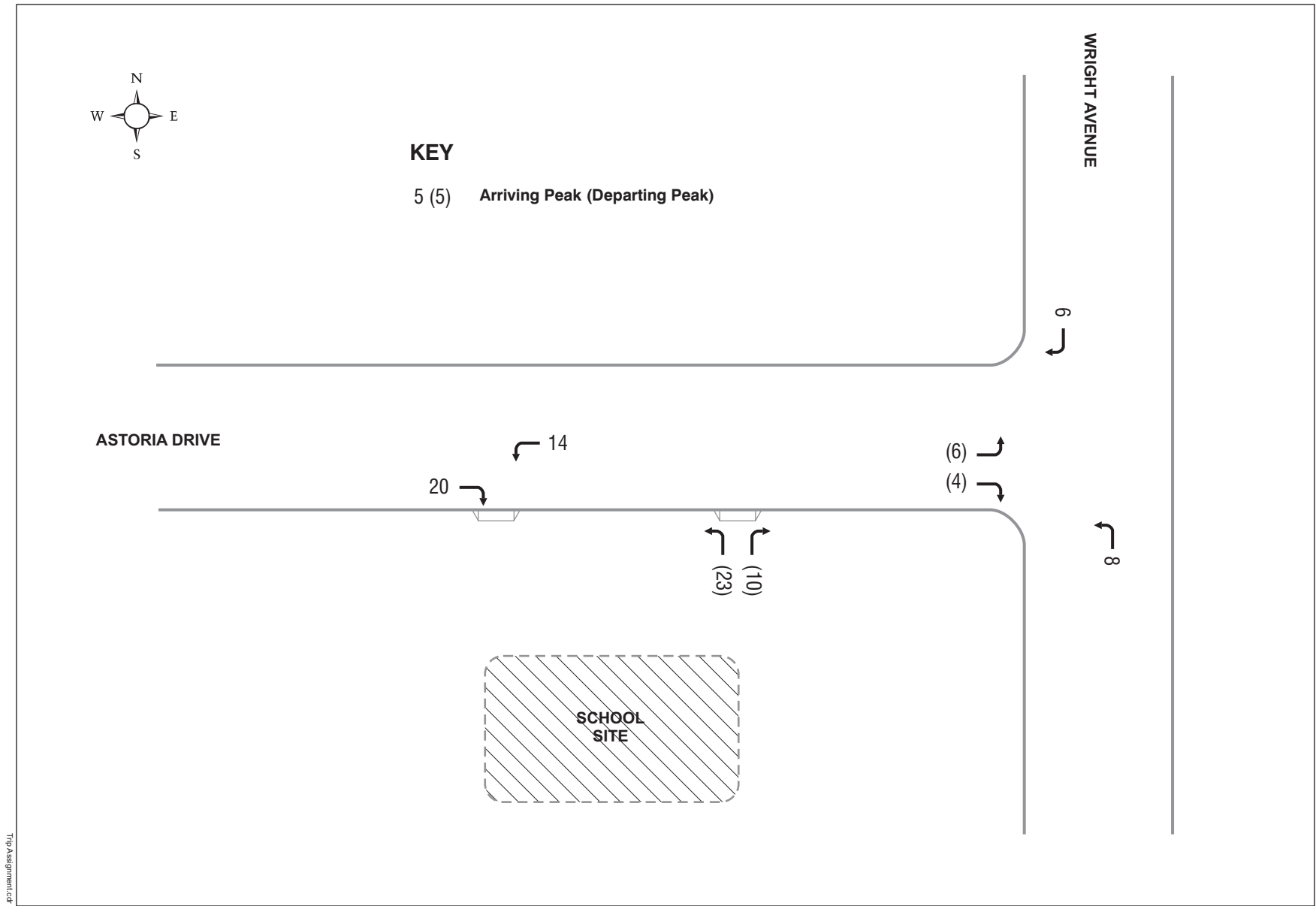
Weekday parking data were collected on a Tuesday and Friday in November, 2004. Tuesday data are mostly associated with the school and Friday data are mainly related to the synagogue activities. On Tuesday, the data were collected over six time periods, coinciding with peaks in school parking demand. Weekend parking data were compiled for the peaks in demand on Saturday and Sunday. Saturday parking demand is generally a combination of synagogue activities and sports activities at the adjacent park. Sunday parking is mostly associated with the adjacent park. The school has not objected to the uses of their private parking for the adjacent sports fields. The following time periods were surveyed.

#### **Weekday**

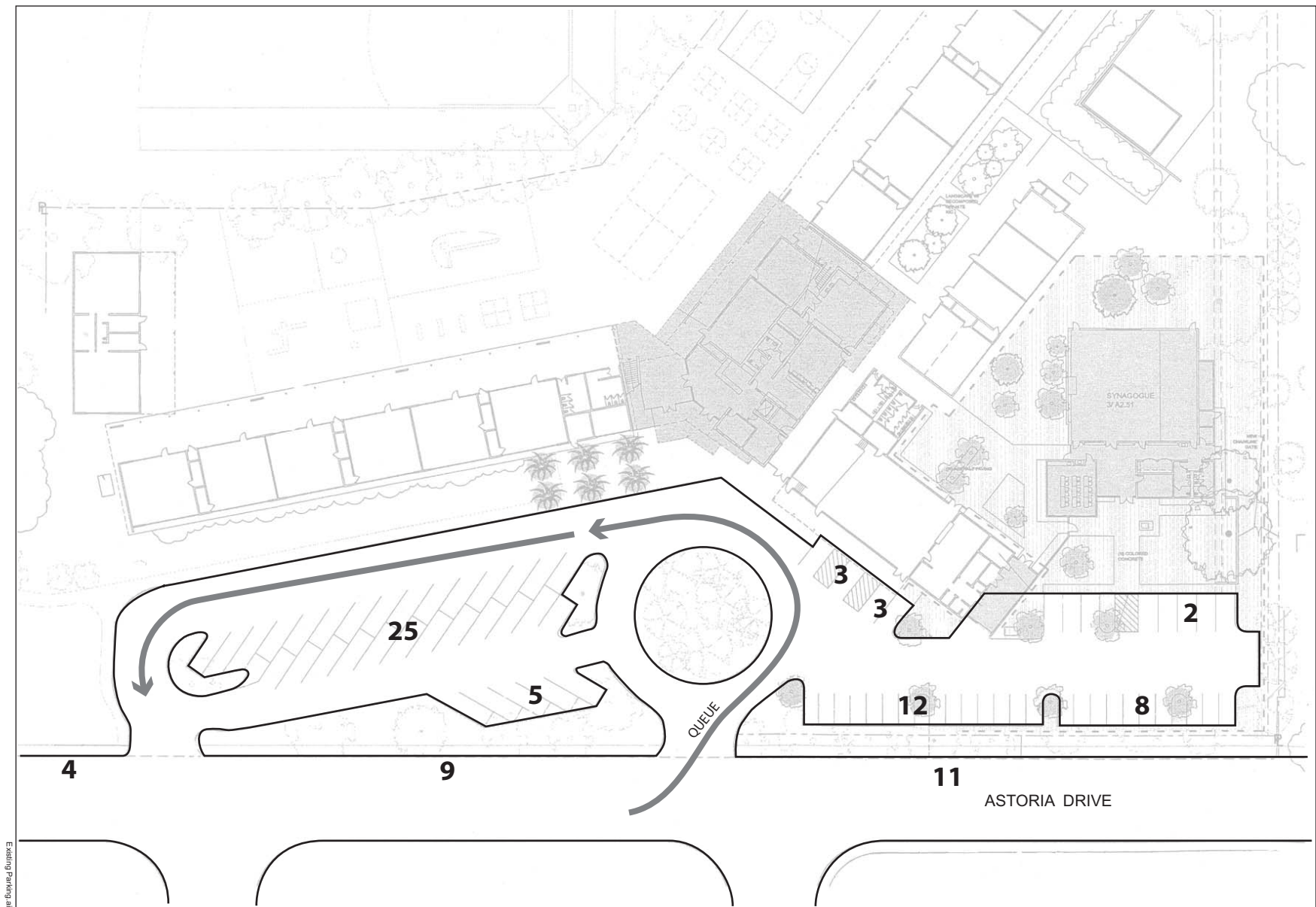
- 7:30 AM
- 8:00 AM
- 10:30 AM
- 12 PM to 1 PM
- 1:30 PM
- 2:30 PM to 4 PM

#### **Friday**

5:00 PM to 6:00 PM



Trip Assignment.cdr



Existing Parking at





### **Saturday**

9:00 AM to 10:00 AM

### **Sunday**

2:00 PM to 3:00 PM

The parking data collected are summarized in Table 17. The following is a summary by time periods.

### **Tuesday**

On Tuesday, the parking data were collected over six time periods. All parking demand is attributed to school activities. At 7:30 AM, 15 off-street and two on-street parking spaces were observed to be occupied. At 8:00 AM, 56 off-street, including two handicap spaces were found to be occupied. During this same time period, 15 on-street parking spaces were also occupied. The 8:00 AM time period was found to be the highest parking demand for the school. At 10:30 AM, 40 off-street and seven on-street parking spaces were used. At 12 PM (noon), 54 off-street spaces and 13 on-street spaces were occupied. This time period was the second highest demand for school parking. At 1:30 PM, 37 off-street and four on-street spaces were used. At 2:30 PM, 48 off-street spaces and 11 on-street spaces were used.

On a typical weekday, the current off-street school parking, along with the on-street parking in front of the school, meets the demand. Occupancy levels reached 87 percent at 8:00 AM and 82 percent at noon. During all other time periods, the parking demand was significantly less.

### **Friday**

Friday parking between 5:00 PM and 6:00 PM was observed to determine the demand associated with the synagogue. A total of 16 off-street and two on-street spaces were observed to be occupied during this time period. The demand is 22 percent of the supply on a Friday evening.

### **Saturday**

Saturday parking was observed between 9:00 AM and 10:00 AM. Through observation, it was concluded that the off-street parking was generally associated with synagogue activities and the on-street parking was associated with the adjacent sports fields. As noted in Table 17, 20 off-street spaces and 11 on-street spaces were occupied. Sufficient parking is available to meet the current Saturday parking demand.

### **Sunday**

Sunday parking was observed between 2:00 PM and 3:00 PM. Thirty-five off-street parking spaces were occupied, generally associated with the school and the sports park. During this time period, 13 on-street parking spaces were occupied, mostly by users of the sports park. Sufficient parking is available to meet the current Sunday parking demand.

**Table 17      Parking Data**

Parking Area		Capacity	Demand								
			Tue						Fri	Sat	Sun
			730	800	1030	1200	1330	1430	1700	900	1400
Off-Street Parking	Regular	55	15	54	38	51	35	45	16	20	35
	Handicap.	3	0	2	2	3	2	3	0	0	0
	<b>Total</b>	<b>58</b>	<b>15</b>	<b>56</b>	<b>40</b>	<b>54</b>	<b>37</b>	<b>48</b>	<b>16</b>	<b>20</b>	<b>35</b>
On-Street Parking	Regular	24	2	15	7	13	4	11	2	11	13
	Handicap.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	<b>Total</b>	<b>24</b>	<b>2</b>	<b>15</b>	<b>7</b>	<b>13</b>	<b>4</b>	<b>11</b>	<b>2</b>	<b>11</b>	<b>13</b>
<b>Total Parking</b>		<b>82</b>	<b>17</b>	<b>71</b>	<b>47</b>	<b>67</b>	<b>41</b>	<b>59</b>	<b>18</b>	<b>31</b>	<b>48</b>

### ***Future Parking Demand***

Future parking demand has been estimated using the existing data collected and the magnitude of the potential school and proposed synagogue expansions. The estimated future parking demand and the proposed parking capacities are summarized in Table 18. Figure 20 shows the proposed site plan. The proposed site plan provides 86 off-street spaces, including four handicap spaces. This represents an increase of 28 spaces over the current supply. The 24 on-street spaces also remain, for a total future supply of 110 parking spaces.

The potential increases in the number of students attending the school and the seats in the synagogue will likely increase the demand for parking. Table 18 summarizes the projected demand. The greatest parking demand is found at 8:00 AM and again at noon, exactly as was found for the existing conditions. Parking demand at 8:00 AM is 98 spaces and parking demand at noon is 93 spaces, both well within the supply of 110 spaces.

The parking demand shown on Table 18 for a typical Sunday is for a mid-afternoon period. A total of 66 parking spaces are projected to be used at 2:00 PM. The City of Sunnyvale requested that parking for a typical Sunday be evaluated if the site housed a typical church. A 5,717 square foot church would require 45 parking spaces based on a demand of 7.81 parking spaces per 1,000 square feet from the 3<sup>rd</sup> Edition of ITE's Parking Generation. Therefore, the parking demand of a typical church could be accommodated by the proposed site plan.

**Table 18      Estimated Future Parking Demand**

Parking Area		Capacity	Demand								
			Tue						Fri	Sat	Sun
			730	800	1030	1200	1330	1430	1700	900	1400
Off-Street Parking	Regular	82	21	75	53	71	48	62	25	31	48
	Handicap.	4	0	3	3	4	3	4	0	0	0
	<b>Total</b>	<b>86</b>	<b>21</b>	<b>78</b>	<b>55</b>	<b>75</b>	<b>51</b>	<b>66</b>	<b>25</b>	<b>31</b>	<b>48</b>
On-Street Parking	Regular	24	3	21	10	18	6	15	3	17	18
	Handicap.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	<b>Total</b>	<b>24</b>	<b>3</b>	<b>21</b>	<b>10</b>	<b>18</b>	<b>6</b>	<b>15</b>	<b>3</b>	<b>17</b>	<b>18</b>
<b>Total Parking</b>		<b>110</b>	<b>24</b>	<b>98</b>	<b>65</b>	<b>93</b>	<b>57</b>	<b>82</b>	<b>28</b>	<b>49</b>	<b>66</b>

## CONCLUSIONS

Table 19 summarizes the existing and future average daily traffic (ADT) volumes on the adjacent roadways. ADT increases provide a good measure of the effect of a project on the adjacent roadways. The future traffic volumes are noted in Table 19 for the Expected Condition and for a Maximum Condition. The Expected Condition represents the synagogue and library expansion, but no increase over the current student population of 260 students. The Maximum Condition assumes an increase in students to 360 and also that the 5,717 synagogue expansion will function in a manner like a typical church.

**Table 19 Existing and Future Average Daily Traffic**

Location	Existing ADT			Expected ADT						Maximum ADT					
				Weekday		Saturday		Sunday		Weekday		Saturday		Sunday	
	Weekday	Saturday	Sunday	Vol	% Inc.	Vol	% Inc.	Vol	% Inc.	Vol	% Inc.	Vol	% Inc.	Vol	% Inc.
Astoria Dr. w/o Site	880	453	567	899	2%	463	2%	567	0%	1,055	20%	483	7%	683	20%
Astoria Dr. e/o Site	936	465	555	960	3%	471	1%	555	0%	1,150	23%	495	6%	649	17%
Wright Ave. n/o Astoria Drive	3,777	2,764	2,240	3,787	<1%	2,766	<1%	2,240	0%	3,886	3%	2,779	<1%	2,290	2%
Wright Ave. s/o Astoria Drive	3,024	2,285	1,745	3,034	<1%	2,287	<1%	1,746	0%	3,125	3%	2,300	1%	1,790	2%

The Expected ADT increases on Astoria Drive will range from 1 percent to 3 percent. The Expected ADT increases on Wright Avenue will be less than 1 percent.

The Maximum ADT increases on Astoria Drive, however unlikely, will be in the neighborhood of 20 percent. The Maximum ADT increases on Wright Avenue will be 2-3 percent.

Parking for all activities at the school and synagogue can be accommodated by the proposed off-street parking and the on-street curb parking in front of the school. The SPHDS intends to allow parking for the adjacent athletic fields to continue to occur on the school grounds